REMARKS

This paper responds to the Office Action mailed on January 23, 2006.

Claims 1, 2, 14, 27, 42, and 51 are amended, no claims are canceled, and no claims are added; as a result, claims 1- 61 are now pending in this application. The amendments to the claims are fully supported by the specification as originally filed. No new matter is introduced. Applicant respectfully requests reconsideration of the above-identified application in view of the amendments above and the remarks that follow.

Support for the amendments to the claims may be found in the specification, for example, on page 21, lines 1- 6 and page 21, lines 15-24.

Objections to the Specification

The disclosure was objected to for informalities. Applicant notes that is not uncommon for the extinction coefficient to be referred to as an absorption coefficient, as can be understood by one skilled in the art. *(See, for example, Fairbairn et al., U.S. 6,841,341 and Sudijono et al. U.S. Publication No. 2004/0092098, both cited in the instant Office Action.)* The extinction coefficient is a dimensionless parameter, which at a given wavelength is related to its corresponding absorption coefficient that has dimensions of inverse length. As used in the specification and shown in the Figures 1B and 1C, the coefficient k of the instant application is dimensionless. The specification is amended to clarify the dimensionless coefficient used in the specification. No new matter is introduced.

Withdrawal of the objections to the specification is respectfully requested.

Claim Objections

Claims 1-61 were objected to for informalities. Applicant notes that is not uncommon for the extinction coefficient to be referred to as an absorption coefficient, as can be understood by one skilled in the art. *(See, for example, Fairbairn et al., U.S. 6,841,341 and Sudijono et al. U.S. Publication No. 2004/0092098, both cited in the instant Office Action.)* The extinction coefficient is a dimensionless parameter, which at a given wavelength is related to its corresponding absorption coefficient that has dimensions of inverse length. As used in the specification and shown in the Figures 1B and 1C, the coefficient k of the instant application is

dimensionless. The claims are amended as suggested by the Examiner. No new matter is introduced.

Withdrawal of the objections to claims 1-61 and reconsideration and allowance of claims 1-61 is respectfully requested

§102 Rejection of the Claims

Claims 1, 2, 7 and 10 were rejected under 35 U.S.C. § 102(b) for anticipation by He et al. ("Characterization and optical properties of diamondlike carbon prepared by electron cyclotron resonance plasma," page 1055, March 1999). Applicant traverses these grounds of rejection of these claims.

Applicant cannot find in He et al. (hereafter He) a disclosure, a teaching, or a suggestion of a method that includes forming an amorphous carbon layer for a semiconductor device structure including introducing a carbon-containing process gas and a spreading gas of helium or a nitrogen containing gas composition over a wafer to form the amorphous carbon layer having an extinction coefficient between about 0.001 and about 0.15 at a wavelength of 633 nanometers as recited in amended claim 1. In addition, though He uses a CH_4 and Ar mixture, He does not disclose, teach, or suggest using Ar as a spreading gas as taught in the specification of the instant application. For at least these reasons, He does not teach the identical invention in as complete detail as is contained in claim 1. Thus Applicant submits that He does not anticipate claim 1 and that claim 1 is patentable over He.

Claims 2, 7, and 10 are dependent on claim 1. Therefore, Applicant submits that He does not anticipate claims 2, 7, and 10 and that claims 2, 7, and 10 are patentable over He for at least the reasons stated above with respect to claim 1.

Applicant respectfully requests withdrawal of these rejections of claims 1, 2, 7 and 10, and reconsideration and allowance of these claims.

First§103 Rejection of the Claims

Claims 3-6, 8, 9, 11, 12, 14-25, 27-34, 37-40, 51-58 and 61 were rejected under 35 U.S.C. § 103(a) as being unpatentable over He et al. in view of Fairbairn et al. (U.S. 6,841,341). Applicant traverses these grounds of rejection of these claims.

Applicant reserves the right to swear behind Fairbairn et al. (hereafter Fairbairn) at a later date.

Applicant cannot find in the combination of He and Fairbairn a teaching or suggestion of a method that includes forming an amorphous carbon layer for a semiconductor device structure including introducing a carbon-containing process gas and a spreading gas of helium or a nitrogen containing gas composition over a wafer to form the amorphous carbon layer having an extinction coefficient between about 0.001 and about 0.15 at a wavelength of 633 nanometers as recited in claim 1. In the Office Action, it is stated that "He et al. teaches a spreading gas of argon (Ar) but does not discuss other gas mixtures. Fairbairn et al. (US 6,841,341) teaches using nitrogen (N_2), ammonia (NH_3), Ar mixed with N_2, or helium (He) as spreading gas [column 6, lines 1-10]." Applicant respectfully disagrees. Applicant submits that though He uses a CH_4 and Ar mixture, He does not disclose, teach, or suggest using Ar as a spreading gas as taught in the specification of the instant application. Fairbairn uses helium to control density and deposition rates *(See Fairbairn column 6, lines 1-10)*, which does not teach or suggestion using He as a spreading gas as taught in the specification of the instant application. In addition, Fairbairn recites at column 6, lines 43-45, "[t]he light absorption coefficient, k, of the amorphous carbon layer can be varied between about 0.1 to about 1.0 at wavelengths below about 250 nm." Fairbairn further recites at column, lines 55-61, "[t]he absorption coefficient of the amorphous carbon layer can also be varied as a function of the additive used in the gas mixture. In particular, the presence of H_2, NH_3, N_2 or combinations thereof, in the gas mixture can increase the k value by about 10% to about 100%." This quote from Fairbairn indicates that the gases other than hydrocarbon compounds used in forming amorphous carbon affect the absorption coefficient (extinction coefficient) of the amorphous carbon formed. Since Fairbairn does not teach or suggest the absorption coefficient (extinction coefficient) for amorphous carbon for wavelengths above 250 nm and He does teach or suggest the effects of a spreading gas of helium or a nitrogen containing gas composition in the formation of amorphous carbon, Applicant submits that the combination of He and Fairbairn, as proffered in the Office Action, does not teach or suggest all the features in forming an amorphous carbon layer having an extinction coefficient between about 0.001 and about 0.15 at a wavelength of 633 nanometers as recited in claim 1. Thus, Applicant submits that the combination of He and Fairbairn, as proffered in the Office Action,

does not teach all the elements of claim 1 and that claim 1 is patentable over He in view of Fairbairn.

For at least reasons similar to those stated above, Applicant submits that independent claims 14, 27, and 51 are patentable over He in view of Fairbairn. Claims 3-6, 8, 9, 11, 12, claims 15-25, claims 28-34 and 37-40, and claims 52-58 and 61 depend on claims 1, 14, 27, and 51, respectively, and are patentable over He in view of Fairbairn for at least the reasons stated.

Applicant respectfully requests withdrawal of these rejections of claims 3-6, 8, 9, 11, 12, 14-25, 27-34, 37-40, 51-58 and 61, and reconsideration and allowance of these claims.

Second § 103 Rejection of the Claims

Claim 13 was rejected under 35 U.S.C. § 103(a) as being unpatentable over He et al. in view of Sudijono et al. (U.S. Publication No. 2004/0092098). Applicant traverses these grounds of rejection of these claims.

Applicant reserves the right to swear behind Sudijono et al. (hereafter Sudijono) at a later date.

In the Office Action, it is stated that "Sudijono et al. (U.S. 2004/0092098) teaches a method of a method of forming an amorphous carbon layer with a He flow rate of 110-1000 sccm [0034]." Sudijono also recites in paragraph [0034]: "the refractive index values (n and k) can be tuned by adjusting the gas mixture to provide a range of n values from 1.3 to about 1.6 at 193 nm and a range of k values from 0.25 to about 0.68 at 193 nm." Since Sudijono does not teach or suggest the absorption coefficient (extinction coefficient) for amorphous carbon for wavelengths at 633 nm and He does teach or suggest the effects of a spreading gas of helium in the formation of amorphous carbon, Applicant submits that the combination of He and Sudijono does not teach or suggest all the features in forming an amorphous carbon layer having an extinction coefficient between about 0.001 and about 0.15 at a wavelength of 633 nanometers as recited in claim 1. Applicant submits that the combination of He and Sudijono, as proffered in the Office Action, does not teach or suggest all the features in forming an amorphous carbon layer having an extinction coefficient between about 0.001 and about 0.15 at a wavelength of 633 nanometers as recited in claim 1. Thus, Applicant submits that the combination of He and Sudijono, as proffered in the Office Action, does not teach all the elements of claim 1 and that

claim 1 is patentable over He in view of Sudijono. Claim 13 depends on claim 1 and is patentable over He in view of Sudijono for at least the reasons stated herein.

Applicant respectfully requests withdrawal of these rejections of claim 13, and reconsideration and allowance of this claim.

Third §103 Rejection of the Claims

Claims 26 and 41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over He et al. and Fairbairn et al. as applied to claim 14 and 17 above, and further in view of Sudijono et al. Applicant traverses these grounds of rejection of these claims.

In the Office Action, it is stated that "Sudijono et al. (U.S. 2004/0092098) teaches a method of a method of forming an amorphous carbon layer with a He flow rate of 110-1000 sccm [0034]." Sudijono also recites in paragraph [0034]: "the refractive index values (n and k) can be tuned by adjusting the gas mixture to provide a range of n values from 1.3 to about 1.6 at 193 nm and a range of k values from 0.25 to about 0.68 at 193 nm." Applicant submits that combining Sudijono with He and Fairbairn, as proffered in the Office Action, does not cure the deficiencies of applying He and Fairbairn to claims 14 and 27 as discussed above. Therefore, Applicant submits that claims 14 and 27 are patentable over He in view of Fairbairn in further view of Sudijono. Claims 26 and 41 depend on claims 14 and 27, respectively, and are patentable over He in view of Fairbairn in further view of Sudijono for at least the reasons discussed herein.

Applicant respectfully requests withdrawal of these rejections of claims 26 and 41, and reconsideration and allowance of these claims.

Fourth §103 Rejection of the Claims

Claims 35, 36, 42-50, 59 and 60 were rejected under 35 U.S.C. § 103(a) as being unpatentable over He et al. in view of Fairbairn et al. and Zhou et al ("Deposition and properties of a-C:H films on polymethyl methacrylate by electron cyclotron resonance microwave plasma chemical vapor deposition method," page 273, 2000). Applicant traverses these grounds of rejection of these claims.

In the Office Action, it is stated that "Zhou et al. teaches a method forming an amorphous carbon layer for an integrated circuit memory structure." Applicant submits that combining Zhou with He and Fairbairn, as proffered in the Office Action, does not cure the deficiencies of applying He and Fairbairn to claims 27 and 57 as discussed above. Therefore, Applicant submits that claims 27 and 57 are patentable over He in view of Fairbairn in further view of Zhou. For at least reasons similar to those stated above with respect to claims 27 and 57, Applicant submits that claim 42 is patentable over He in view of Fairbairn in further view of Zhou. Claims 35 and 36, claims 41-50, and claims 59 and 60 depend on claims 27, 42, and 57, respectively, and are patentable over He in view of Fairbairn in further view of Zhou for at least the reasons discussed herein.

Applicant respectfully requests withdrawal of these rejections of claims 35, 36, 42-50, 59 and 60, and reconsideration and allowance of these claims.

Assertion of Pertinence

Applicant has not responded to the assertion of pertinence stated for the patents cited, but not relied upon, by the Office Action since these patents are not relied upon as part of the rejections in this Office Action. Applicant is expressly not conceding they have any pertinence and reserves the right to respond more fully should any of them form a part of some future rejection.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 371-2157 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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By their Representatives,

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